THE

AGRICULTURAL MUSEUM.

OMNIS FERET OMNIA TELLUS. VIRG.

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For the Agricultural Museum.

LUCUBRATIONS ON SOILS.....No. 5.

In the foregoing cursory observations upon the subject of soils in general, we have without much loss of time, travelled from the Sea-board to the Glades on the top of the mountains, and with a bird-eye view, we have traced the ridges and mounds, and a few of the most conspicuous, and strongest lines, or natural boundaries, which limit the principal regions of soil. I pretend not to a thorough or scientific knowledge of the subject; my object is to invite and point out the way to proper and useful reflections on a subject the most important to mankind. The descriptions given, are such as will apply to the formation of lands in all parts of the globe. Yet, the foregoing observations refer principally to all that portion of land which lies between the mouths of the rivers emptying into the Chesapeake bay, and their sources at the foot of the Allegahany. We have shewed in what manner, the rivers and waters by their perpetual action, and the great laws of composition, vegetation and decomposition, affinity and gravitation have formed, and are unceasingly changing and making land, and that time is the great executor of all these laws. Although these great principles are so very gradual and slow in their operation, that the span of a man's life, are to the great works of nature, only as an hour—yet, I thought it necessary, before I introduced the dissertation and analysis of the chymist's

upon soils and plants, to premise a short tract explanatory of the fundamental laws of nature, which are the primary cause of the changes and variety of soils, without a knowledge of which, as full and clear a comprehension as the subject will admit, at this time, could not be had. We have also set bounds to some of the principal regions of soil, and shewn that the surface, elevation, and position generally, to say nothing of other causes, form material differences in soil and produce, sufficiently distinct characteristic traits on which to bottom a system of classification.

I will now, according to the promise made in my first number, proceed to a more minute and specific description of the soils most commonly found, shewing the analysis and composition of fertile soil, and the food of plants, taken almost wholly from Kirwan and the most approved chymical writers. At the same time I will shew the general position of the kinds of soils described in the regions heretofore spoken of. Preparatory to this investigation, it is necessary to settle accurately the meaning of the names and distinctions of soils, elementary earths and manures, intended to be used; as the terms used by Agricultural writers are frequently very vague, and have different meanings in different places and countries.

I shall adopt the distinctions and denominations given in the first chapter of Mr. Kirwan's treatise on manures and soils, as follows:

Land considered as the basis of vegetation is called *Soil.*

Soils consist of different combinations of two or more of the four primitive earths, namely, the calcareous, (which sometimes he calls mild calx) magnesia, argill, and the silicious. For a more accurate description of these I must refer to books of mineralogy, and shall only remark that by calcareous earths, are meant chalk, and all stones that burn to lime. They are easily

distinguished by their property of effervescing with acids.

Magnesia is never found alone; its distinguishing character consists in affording a bitter salt, generally called Epsom salt, when combined with the vitriolic acid.

Argill is that part of clay to which this owes its property of feeling soft and unctuous, and of hardening in fire; it is difficultly soluble in acids, and scarce ever effervesces with them. When combined with the vitriolic acid, it forms allum.

Silicious Earth is often found in a stony form, such as flint or quartz, and still more frequently in that of a very fine sand, such as that whereof glass is made. It does not effervesce, nor is it soluble in any of the common acids.

To these we may add iron, in that imperfect state in which it exists when reduced to rust, and commonly called calx of iron.

Clay is of various colours; for, we meet with white grey, brownish red, brownish black, yellow, or bluish clays, it feels smooth and somewhat unctuous: if moist, it adheres to the fingers, and if sufficiently so, it becomes tough and ductile; if dry, it adheres more or less to the tongue; if thrown into water, it gradually diffuses itself through it, and slowly separates from it. It does not usually effervesce with acids unless a strong heat be applied, or that it contains a few calcareous particles, or magnesia. If heated, it hardens and burns to brick.

It consists of argill and fine sand, usually of the silicious kind in various proportions, and more or less ferruginous. The argill forms generally from 20 to 75 per cent of the whole mass. The sand and calx of iron the remainder. These are perfectly separable by boiling in strong vitriolic acid.

Chalk, if not very impure, is of a white colour, moderate consistence, and dirty surface, stains the fingers, adheres slightly to the tongue, does not harden when heated, but on the contrary, in a strong heat burns to lime and loses about four tenths of its weight. It effervesces with acids and dissolves almost entirely therein. I shall also add, that this solution is not disturbed by caustic volatile alkali; as this circumstance distinguishes it from magnesia—it promotes putrefaction.

Sand. By this is meant small loose grains of great hardness, not cohering with water, nor softened by it. It is generally of the silicious kind and therefore insoluble in acids.

Gravel differs from sand chiefly in size; however, stones of a calcareous nature when small and rounded, are often comprehended under that denomination.

Loam denotes any soil moderately cohesive: that is, less so than clay, and more so than loose chalk. By the author of the Body of Agriculture it is said to be a clay mixed with sand.

I do not conceive that clay and sand alone, can properly be called loam, without a portion of decayed vegetable matter which fits it for vegetation, and makes it less heavy than pure clay and sand. In this last sense I have used it, and cannot but think it correct.

Clayey Loam denotes, a compound soil moderately cohesive, in which the argillaceous ingredient predominates. Its coherence is then greater than that of any other loam, but less than that of pure clay. The other ingredient is a coarse sand, with or without a small mixture of the calcareous ingredient. It is this which Farmers generally call strong, stiff, cold, and heavy loam, in proportion as the clay abounds in it.

Chalky Loam. This loam indicates a loam formed of clay, coarse sand and chalk; in which, however, the

calcareous ingredient or chalk much predominates. It is less cohesive than clayey loams.

Sandy Loam denotes a loam in which sand predominates—it is less coherent than either of the above mentioned. Sand partly coarse and partly fine, forms from 80 to 90 per cent of this compound.

Gravelly Loam differs from the last only in containing a larger mixture of coarse sand or pebbles. This and the two last, are generally called by farmers, light or hungry soils, particularly when they have but little depth—They are properly so called when the chalk, sand or gravel preponderates too much, so that it will not retain a sufficiency of moisture, not otherwise; for gravelly loams and sandy loams are often found very fertile and durable; for instance, the best tobacco lands in Maryland.

Ferruginous loam, or till. This is generally of a dark brown, or reddish colour, and much harder than any of the preceding. It consists of clay and calces of iron more or less intimately mixed. It may be distinguished not only by its colour, but also by its superior weight; it sometimes effervesces with acids, and sometimes not; when it does, much of the irony part may be separated by pouring it, when well dried, into spirit of salt, from which the iron may afterwards be separated by alkali or chalk—akin to this are certain vitriolic soils, which when steeped in water, impart to it the power of reddening syrups of violets. These are generally of a blue colour, but redden when heated.

Boggy Soil or *Boggs*, consist chiefly of ligneous roots and decayed vegetables mixed with earth, mostly argillaceous, and sand and a coaly substance, derived from decayed vegetables.

Of Boggs there are two sorts, the black, which contains a large proportion of clay, and of roots more perfettly decayed, with mineral oil. In the red, the roots seem less perfectly decayed, and to form a principal part.

SYLVANUS.

[To be continued.]

OBSERVATIONS ON STEAM ENGINES.

From the Aurora of 12th Sept. 1810.

It was in the year 1773 or 1771, thirty five or six years since, I first discovered the principal of my improvement on steam engines, and about twenty seven years since I discovered the means of applying it, to the propelling boats up the Mississippi and other rivers, and carriages on turnpike roads; ever since that discovery I have been endeavoring to persuade those interested to apply those principles to the said purposes, I have travelled hundreds of miles to see different ingenious men, to engage them, but none could be found willing to risque the expence. In the year 1786 I petitioned the legislature of Pennsylvania; they supposed me deranged, and I met from them no encouragement on the subject.

In 1787, I petitioned the legislature of Maryland, and they granted me an exclusive right in that state for 14 years; this patent expired before I could do more than try several experiments. In the year 1801, I began to make a steam engine on the principle, for a plaister mill, it, with the experiments I had to make, cost me $ 3,700, a sum hardly earned, and illy spared at that time, although I succeeded perfectly.

In the year 1802 or 1803, captain James M'Keever and Louis Valcourt having been in Kentucky, a letter which I had written to a gentleman there, explaining how my improvement would apply to steam boats, in the western waters, agreed to construct a steam boat, to ply between New Orleans and Natchez. The captain superintended the building of the boat, and Mr. Valcourt came to Phildelphia, and in the fall 1803, had the engine constructed at my shop, while I was at the City of Washington, and they met at Orleans, fitted the engine to the boat, ready for experiment—but the water had left them high and dry, not likely to raise to float the boat in less than 6 months, they having expended about $ 15,000, their money was exhausted, and they left in a sad dilemma. Mr. Wm. Donaldson of Orleans, furnished

them with money, on condition they would take the engine out of the boat, and apply it to drive a sawmill there, to saw timber; this they did, and began to saw 2000 feet of boards in 12 hours, when incendiaries set fire to their mill and reduced it to ashes—Thus failed the most noble enterprise ever undertaken by individuals under similar circumstances. They have both written to me frequently, that they were confident that the power of the engine was quite sufficient to have ensured success in propelling the boat, and they entertained sanguine hopes of being yet able to put the principle in operation, but the noble enterprising spirit of captain M'Keever has left us, to rest from trouble; he died while engaged in getting his engine up again to saw timber.

In the year 1804, Dr George Hunter of Philadelphia, having seen my little engine, 6 inches diameter, and 18 inches stroke, driving 12 saws, sawing stone, had represented the same to Mr. W. Donaldson, of New Orleans, which had induced him to order one for to drive 4 saws to saw timber. This engine arrived at New Orleans a few days after M'Keever and Valcourt's mill was burnt, also another from England, of the same power, arrived the same day.

The two companies of workmen set out, each to get their engine to saw. Mr. Donaldson's has been going about three years and six months, driving at first three saws and a pair mill stones, now four saws and the mill stones, sawing daily their task of 3000 feet of boards in 12 hours, and at the same time grinding 5 bushels corn per hour. The boards sell now at 45 to 50 dollars per thousand feet, and the mill clears in profit 20,000 dollars per year, say 60,000 dollars; while the English engine is said to have cost 60 000 dollars, and yielded no profit, owing principally, to its using so much water, that the well will not supply it, and the difficulty of attending and keeping it in order, so that the difference between the two establishments at this day, appears to be very great indeed in point of profits.

Can English engineers believe this, when they are informed that the cylinder of this engine, is only nine inches in diameter, the stroke of the piston three feet. If they could believe it, they would acknowledge that my principle is the only one now in use, suitable for propelling boats up the Mississppi, as well as preferable for every other purpose.

Truly there has not been this engine's equal; for it is ten times as powerful as the best English engine, of equal dimensions, and so simple in its structure, that an Irish weaver, employed to assist in constructing it, became master of every part of the work, and can build one as good, and attend it as well as any man. It has no equal excepting one whose cylinder is 9 2-10 in diameter, and 3ft. 2 in. stroke, which I have since applied to grind grain in Pitsburg, in co. with Mr. Owen Evans, who is among the first willing to risk his money on a new thing; with this engine I would engage to grind 480 bushels wheat in twenty-four hours.

When I reflect on the expence of time, labor and money that it has cost me, the many difficulties I have met with, in getting this improvement into use, one calculated to render this country more benefits than any other yet made—When steam boats on the Mississipi shall become as numerous as other craft on the Delaware, performing a voyage in 5 days, which now requires thirty, moving with power from 100 to 500 or more men—When I view the progress I have been able to make in 27 years, and find the minds of many as firmly shut against the light as ever, I am astonished, and believe, I am justly entitled to both the honors, and profits, of my improvement, if any is ever to be received.

I have been agitated between hope and despair, respecting the application of my improvements to boats on the Mississippi, during my life, which was originally and always my principal object, and next to it a steam mill in Pittsburg; the one is accomplished, and so will

the other be, as soon as the principle shall be applied. I have waited as an humble suppliant petitioner, on Congress, for two whole sessions, endeavoring to induce them to extend the time to patentees, which would enable them to draw to their aid monied men, this is not yet done, but the prospects have brightened.

On Sunday, 26th August last, I passed in the Phœnix steam boat, from Philadelphia to Bristol, about twenty miles distant, and was highly delighted to find my hopes so far realized. She moved majestically through the water passing row boats, with such rapidity that it was vain for them to attempt to board, if they fell astern; offering a safe, commodious and certain passage to travellers, against wind or tide.

I was, however, sorry to find, in conversation with Mr. Stevens, son of John Stevens, esq. the owner, that he did not appear to be fully convinced, that there was one thing still wanting, to enable him to stem the rapid current in the Mississippi—viz. the application of the irresistible power of elastic steam, when it is sufficiently confined, from which we may obtain any power we may want, and keep it up, to work the engine with very little more expense of fuel.

The application of this principle to my engine is what I have patented, the use of which having been exploded as unconfinable, ungovernable, disadvantageous, and dangerous, for one hundred years past. It was not known and used before I discovered an error in the rule for calculating, and a true rule for ascertaining its power to burst the boiler, & the thickness of the iron necessary to hold it, arranged an engine, and applied it successfully.

The principle of confining and retaining the steam, to gain power, save fuel, to lessen the size and weight of the engine, to simplify it by rendering a condenser unnecessary in most cases, and to lessen the quantity of water necessary to work an engine thereby to fit it for boats, or carriages, also mills to be set any where on wells, was

become free to be patented by any one who could make the discovery, so useful, and so much wanted.

They have, however, abandoned their tube boilers, which they patented one year after my principle had been steadily in useful operation, and have followed me and copied my engine, so exactly, that they have the identical same form of boiler, consisting of cylinders of strong sheet iron, 3 feet 6 inches diameter, 18 feet long, to contain the water and steam, with flues to pass the fire through them, that it may generate the more steam, and save fuel. This being the form recommended by me in my book, explaining the principles, and the application of my improvements. They also apply a forcing pump, which becomes necessary in using the principle, to supply their boilers with water, so that they have my form of engine in use, and are prepared to use my patented principle also when they need it, and can by these means treble their present power with safety, when they please, which will enable them to ascend the Mississippi 50 or 60 miles a day, by day light, and to excel all other steam boats with engines of equal dimensions.

I do not know whether they mean to infringe my patent right in full, or to obtain my licence to use my principle, which (to encourage the enterprize) I would grant at a low price.

I have, at great labour and expense, prepared my works to construct my engines, for those who may want them for any and every purpose, and if there was nothing else to recommend them, their simplicity is well worthy of notice, they do not use more than 1-40th or 1 50th part the water, and consume much less fuel than others, are less liable to be impaired, are easier under stood and attended, occupy less room, and will apply to every purpose for which steam engines are useful, and when applied to boats, will pass all other steam boats, as they now pass row-boats.

OLIVER EVANS.

TO DESTROY CATERPILLARS.

As the season is arrived for the insects which produce the canker worm, to quit their wintry abode, and ascend to the apple trees, it may not be amiss to publish a few observations and experiments on the subject.

A neighbor of mine observed an article in the papers of the last year, advising to inclose the trunk of the trees with a narrow bag made with linen cloth filled with fine salt; but he not having any cloth suitable for the purpose, used a substitute, what the farmers call swingling tow, which he twisted into a large string and long enough to go round the body of the tree, putting in salt as he twisted it up, so as to enclose the tree with salt, about two feet from the ground—this tree was loaded with fruit in the fall of the year, while the other trees in the orchard appeared as if a fire had passed through them; which experiment, I think, goes far to establish the fact, that the salt used in either way will preserve the trees from the ravages of the canker worm.

The caterpillar or bag worm I am confident may be prevented from injuring the fruit of the apple tree, by placing a turf in a crotch of the tree. I tried it in a number of trees in my orchard the last season, and there was none of the worms to be seen on them through the summer; but one tree which I neglected, I found when the worms were about half grown, was like to be injured by that pernicious insect. I then destroyed as many of them as I conveniently could and applied the turf, and in a few days there was not one to be seen on the tree.

Another neighbor of mine informed me that he had a couple of plumb trees in his garden, standing some distance from each other; in the summer he found that one of them was covered with bag worms, and recollecting the advertisement which recommended the use of the turf, he applied one to the infected tree, and the consequence was that they left that tree and took to the other.

M Republican.

Columbian Agricultural Society.

At a general Meeting of the Columbian Agricultural Society at Georgetown, on Wednesday the 15th inst. their Exhibition was held in a pleasant grove, the property of Thomas Beall of George, Esq. adjoining Mr. Parrot's Rope Walk, when the following Premiums, to be paid in plate with suitable devices, or the amount in cash, were awarded, viz.

Premium 1—To the value of Sixty Dollars: For the best two toothed Ram Lamb, of the fine wooled breed;

Adjudged to General JOHN MASON, of Analostan Island, District of Columbia, for his seven-eighths blooded Merino Ram, Potomac Chief, of the breed of Col. Humphreys' flock.

Premium 2—To the value of Sixty Dollars: For the second best two toothed Ram Lamb, of the long wooled breed;

Adjudged to JACOB GIBSON, Esq. of Talbot county, Eastern Shore, Maryland, for his long wooled Ram, Pizarro, of the Calvert County breed.

Premium 3—To the value of Forty Dollars: For the second best two toothed Ram Lamb, of the fine wooled breed;

Adjudged to Mr. ROGER BROOK, of Montgomery county, Maryland, for his half blooded Merino Ram, Hopewell, of Dupont's breed.

Premium 4—To the value of Forty Dollars: For the second best two toothed Ram Lamb, of the long wooled breed;

Adjudged to WM. BOWIE, Esq. of Prince George's county, Maryland, for his long wooled Ram, of the common country breed.

Premiam 5—To the value of Forty Dollars: For the greatest number of Lambs, in proportion to the number of Ewes, dropped and raised in one flock of not less than 40 Ewes; provided, that the number of Lambs be at least equal to the number of Ewes;

Adjudged to JACOB GIBSON, Esq. of Talbot county, Maryland.

Premium 6.—To the value of Thirty Dollars: For the best piece of cotton cloth, proper for women's dresses, not less then 10 yards;

Adjudged to Mrs. ELIZABETH BAILEY, of Ann Arundle county, Maryland.

Premium 7.—To the value of 30 Dollars: For the best piece of fancy patterns for vests, not less then ten yards,

Adjudged to Mrs. ELIZ. BAILEY, of Ann Arundle county, Maryland.

Prumium 8.—To the value of 30 dollars: For the best piece of cotton cloth, suitable for pantaloons or small clothes, not less then 10 yards;

Adjudged to Mrs. MARTHA P. GRAHAM, of Dumfries, Prince William county, Virginia.

Premium 9—To the value of 10 Dollars: For the best pair of woven Stockings, of cotton or thread, full size;

Adjudged to Mrs. ANNA M. MASON, of Analostan Island, District of Columbia.

Premium 10—To the value of 30 Dollars: For the best piece of hempen flaxen sheeting, not less than ten yards;

Adjudged to Mrs. BRUCE, of Alleghany county, Maryland.

Premium 11—To the value of 30 dollars: For the best piece of hempen or flaxen shirting, not less than ten yards;

Adjudged to Mrs. ELIZABETH BAILEY, of Ann Arundel county, Maryland.

Premium 12—To the value of 30 Dollars: For the best piece of hempen or flaxen table linen, not less than ten yards;

Adjudged to Mrs. KIMBALL, of Fredericktown, Md.

Premium 13—To the value of 20 Dollars: For the best piece of twilled bagging of hemp, flax, or cotton, not less than ten yards;

Adjudged to Mrs. MARY CANBY, of Montgomery county, Maryland.

Premium 14—To the value of 20 Dollars: For the best piece of bed ticking of hemp flax or cotton, or in part of all or either, not less than ten yards;

Adjudged to Mrs. SARAH M'CARTY MASON, of Hollin Hall, Fairfax county, Virginia

Premium 15—To the value of 10 Dollars: For shearing a Sheep in the neatest, safest and most expeditious manner;

Adjudged to EDWARD ENO, of Washington city.

Preminm 16—To the value of five Dollars: For shearing a Sheep second best as above;

Adjudged to THOMAS M'GRATH, of Washington city.

Candidates for the fine WOOL *Premiums were*:

	Gross lb.	Fleece lb.
No. 1. Gen. Mason's Potomac Chief	103 3-4	6 3 4
No. 2, Thomas Peter's Montgomery	84 3 4	5 1-4
No. 3, Bazil Darby's Jack,	132 1-4	9 14 oz.
No. 4, R. Brook's Hopewell	93 1 4	4 11
No. 5, Mr. Chichester's ———	94 1-2	5 9

The above fleeces were unwashed.

The first premium awarded to No. 1, and the 3d premium to No. 4.

Candidates for the Long Wool *Premiums, were.*

	Gross lb.	Fleece, lb.
No. 6. Mr. Marbury - -	160	†7 6 oz
7. Mr. Gibson - -	112	*7 6
8. Wm. Bowie - - -	121	†11 12
9. Bazil Darby - - -	113	†9 5
10. Mr. Gibson's Pizarro, -	120 1-4	*7
11. I. Duckett, - - -	111	†8 12
12. Ditto - - - -	121 1-4	8 9

†Washed. *Unwashed.

Premium 2d awarded to No 10, and premium 4 to No 8.

Candidates for the Fifth Premium *were*

	Ewes	Lambs
Jacob Gibson, - - -	64	95
Dr. William Dangerfield, - -	59	80

William Marbury, - - - -	48	65
R. Slaughter, jr. - - - - -	47	58
J Kent, - - - - - -	40	51

The 5th Premium awarded to Jacob Gibson, Esq.

(Signed) W. FOOTE.
J THRELKELD.
GERARD BROOKES.
THOS. HARWOOD, of Benj.
RICHARD K. MEADE.

The subscribers appointed to determine the Premiums for Domestic Manufactures, adjudge the 6th, 7th and 11th premiums to Mrs. Elizabeth Bailey; the 8th premium to Mrs. Martha P. Graham; the 9th premium to Mrs. Anna M. Mason; the 10th premium to Mrs. Bruce; the 12th premium to Mrs. Kimball; the 13th premium to Mrs. Mary Canby; and the 14th premium to Mrs. Sarah M^{c} Carty Mason.

(Signed) BAZIL BROOKE.
R. M. BOYER.
JOHN DAVIDSON.
JOHN HOYE.
HENRY CHILDS.

The Society are under great obligations to Mrs. Beall for the politeness and liberality with which she, in the absence of Mr. Beall, afforded them a place so beautiful and commodious for holding their exhibition; and to Mr. Parrot for the kind attention which he paid to the members and the company, and for the use of a variety of articles necessary to the convenience or beauty of the scene.

David Wiley, Sec'ry.

Georgetown, Col. May 17th, 1811.

The ARTICLES of DOMESTIC MANUFACTURE exhibibited were, perhaps, not so numerous, as on former occasions but their quality was excellent. Many of them might well vie with those which had crossed the Atlantic—and, what is still more important, they were sold at as low a rate. As usual the cottons of Mrs. Graham of Dumfries, and Mrs. Mason of Hol-

in Hall were worthy of high commendation, but those of Mrs. Bailey a new competitor, were judged to be still more perfect; and Mrs. Canby's Bagging which obtained the premium, had but one fault—it was too wide.

The Sheep which were shewn, far exceeded expectation, both as to number and quality. Mr. Gibson brought a flock of thirty four yearling lambs of the long wooled breed from his farm in Talbot county, on the Eastern Shore of Maryland, that were highly esteemed for their size and quantity of wool,-for one of which he obtained the premium of Sixty Dollars. Mr. Marbury shewed a ewe and her two lambs, one of a year old, and the other of this spring, that were of very extraordinary size and beauty—Mr. William Bowie's two toothed Ram of the long wooled breed produced the greatest quantity of wool, and had it been washed, and of a finer fibre, it must certainly have taken the first premium, instead of the second for quantity of wool. Mr. Ducket also shewed two very fine sheep.

Of the fine wooled tups, none could compete with General Mason's Potomac Chief, though those of Messrs Brook, Darby, Chichester and Peter, were certainly fine specimens. But the handsomest sheep shewn on the occasion was General John Mason's quarter blooded Merino ewe.—Her form, her countenance, the quantity and fineness of her wool, were well calculated to render her an object of universal admiration, and to convince every one who saw her, of the vast advantages to be derived from crossing the common sheep of the country with the Merinos.

General Mason, Judge Cranch, and T. Peter Esq. shewed imported Merino Rams of a superior quality—In short, of nearly a hundred shewn, there was not one for which the Exhibitor was not entitled to the thanks of the Society.

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